# Whitewater Canal State Historic Site

## A Journey into the Past

## Lesson Plan for Grades 3 - 5 Text and Activities

#### **Whitewater Canal State Historic Site**

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## Whitewater Canal State Historic Site A Journey into the Past

The early 19th century was an exciting time to be living in Metamora. With the passing of the Mammoth Internal Improvement Act of 1836 came the funds to build a canal through the Whitewater Valley. The canal was a way for people to ship merchandise as well as travel between towns. Through the use of a waterwheel, the canal was also a source of power for many mills, such as the Metamora Grist Mill. Step back in time and experience the past as seen through the Whitewater Canal and Metamora Grist Mill.

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## Vocabulary List

Aqueduct – one body of water going over another body of water.

Canal – an artificial waterway.

Commerce – an interchange of goods among people in one area.

**Dam** – a barrier to control the flow of water.

**Freight Boat** – a boat designed to transport goods.

Grain – a small, hard seed of any food plant.

Grist – grain to be ground.

Mammoth Internal Improvement Act of 1836 – this act enabled the state legislature to borrow \$10 million from the federal government to build roads, canals and railroads throughout Indiana, including the Whitewater Canal.

Lock – a chamber in a canal or dam for raising or lowering vessels by admitting or releasing water.

**Meal** – a course powder ground from the edible seeds of grain.

Miller – a person who ones or operates a mill.

**Packet** – a boat that carries light cargo and passengers regularly on a fixed route.

Stagecoach – a horse-drawn carriage traveling over a regular route.

Waterwheel – a wheel turned by the action of moving water and used to provide power.

## The Whitewater Canal State Historic Site

#### History of the Whitewater Canal

#### The Beginning

The Whitewater Valley stretches along the eastern part of Indiana, beginning today near U.S. 40 and extending southward. The people of early 1800 living in this area needed to find some type of transportation to create an outlet to the outside world. This area was not located near any major cities, making it difficult to receive goods and services. To solve this problem, it was decided to build a canal connecting the Whitewater Valley to outlets of the Ohio River. That connection made it possible for residents of the valley to travel, transport, and receive goods and services previously not available to them.

The Indiana General Assembly passed the **Mammoth Internal Improvement Act of 1836** (Noah Noble was the Governor of the state at this time). This act was designed to improve transportation and develop **commerce** throughout the state. The development of the Whitewater Canal was one of the projects made possible due to this act.

#### Did You Know?

Before the building of canals, transportation was mostly done by **stagecoach** over very rough roads and trails.

#### **Canal Construction**

The canal was originally designed to extend 68 miles, running from Cambridge City in the north to Lawrenceburg in the south. A large ground breaking celebration was held to dedicate the new canal in September 1836. Once the celebration was done, the hard labor began. Using tools like picks, shovels, and mules, the canal was hand-dug by Irish immigrants from around the country. The canal cost roughly \$15,000 per mile and took 10 years to build. One reason the canal took so long to build was because it ended up being 101 miles long overall, instead of the original 68 miles. Eight miles were added on the northern end to extend the canal from Cambridge City to Hagerstown and 25 miles were added at the south to extend to Cincinnati, Ohio (this portion was built by the state of Ohio). The Cincinnati connection would prove to be very important because it opened the large market of a big city to the small rural area of the Whitewater Valley. The second reason it took so long to build the canal was due to the number of locks and dams that had to be built. Overall, the canal had 56 locks and 7 dams to accommodate an elevation drop of 491 feet from the north to the south. These additions also cost money, bringing the total construction cost to \$1,164,655.

#### Did You Know?

A normal canal construction unit consisted of 31 engineers, 1 secretary, 24 rodmen, 20 axemen and 975 laborers.

#### **Canal Boats**

There were two kinds of boats used on the canal: **packets** were used for passengers and light cargo and **freight boats** were mainly used for cargo hauling. The freight boats were very useful for hauling cargo such as building stones, lumber, **grain**, flour, salt, lard, livestock, poultry, produce, whiskey, and tobacco. Canal boats were only allowed to go as fast as four miles per mile, however boat captains rarely abided by that law. Captains were even known to have fights over who would enter the lock first. The first boat to travel on the canal was the *Ben Franklin*, traveling from Lawrenceburg to Brookeville in 1839.

#### Did You Know?

Passengers could ride the entire length of the canal for \$3.00 and the trip would take roughly one week.

#### The Metamora Grist Mill

#### The Development

Jonathan Banes, a former engineer and participant in the digging of the Whitewater Canal, built the Metamora **Grist** mill in 1845. It began as a cotton mill, but since cotton was not grown in the Whitewater Valley, the mill was not very profitable. He later transformed the mill into a grist mill to grind corn and wheat. The original mill was a three-story frame structure built of wood, only to burn down in 1899. It was rebuilt the following year and converted to the brick mill still standing today.

#### **A Mill's Operations**

The waterwheel behind the mill provides the power to operate it. The mill is located next to one of the original locks of the Whitewater Canal. In 1973, a new type of wheel was installed to aid milling operations. It is a breast wheel that turns by the amount of water flowing through a canal lock. It catches the flow of the water about midway up the wheel. The force generated by the mill is transmitted through gears and pulleys from the basement of the mill to the machines on the first floor. The mill grinds hard winter wheat into flour and both white and yellow corn into corn meal and grits. The wheat is ground into flour between two stones that are 24 inches in diameter and arranged upright. The corn is also ground by stones and then sifted by consistency to produce corn meal, grits and feed for the site's ducks and canal boat horses.

#### Did You Know?

The Metamora Grist Mill wheel revolves about 18 times per minute and generates approximately 50 horsepower units.

#### The Importance of Mills

Mill and **millers** were very important for life in small towns during the middle to late 19<sup>th</sup> century. In 1860, there were over 700 operating grain mills in Indiana. Mills were so important that the location of a mill often determined the site of a town. Farmers might exchange news with each other while waiting for their grain to be ground. Many mills, such as the Metamora Grist Mill were located on rivers and streams because these water sources provided power. Roads were often built directly to mills because they were

responsible for grinding grain, setting prices, buying, selling, and serving all the area farmers.

#### Did You Know?

There are now only a few operating mills in Indiana.

#### The End of the Canal Era

Despite the promise of the Whitewater Canal, there were some problems. Within two years after canals finish, there were three floods that washed dams, **aqueducts**, and canal banks away. More money had to be spent to repair these damages. With the introduction of railroads to Indiana, Hoosiers began craving for a cheaper and faster alternative to canal. This new form of transport quickly led to the end of the canal system. No one wanted to travel four miles per hour on a canal when they could travel 25 miles per hour on a train. Trains could also transport more cargo compared to that of small canal boats. Because of this shift in transportation, the canal never paid for itself and, in turn, the state lost much of its money of the canal's construction.

Though the canal brought problems to the state, it also had some positives. Through the Mammoth Internal Improvement Act in 1836, Indiana embarked on various projects designed to leave behind the isolation of pioneer life, on a path of progress that connected its people and products to the rest of the nation and the world. The Whitewater Canal and other canals statewide provided greatly for agricultural expansion and the export of surpluses, importation of eastern merchandise, and for greater economic diversification towards commerce and manufacturing. This led ultimately to the development of business expansion, giving rise to new communities and urban growth. Unequivocally, the impact generated by the development of the canal is reflected yet today by the remnants of that noble undertaking in yesteryear, perhaps best reflected by Indiana's distinction as the "Crossroads of America."

The canal era was an important and lively period in both the state of Indiana and in the United States. The canals were desperately needed at the time, but no one foresaw the rapid development of the railroad. In 1946, the State of Indiana and the Department of Natural Resources began restoring the 14 miles of the original Whitewater canal. This section extends seven miles north and seven miles south from Metamora with water supplied by one of the original canal dams.

#### Did You Know?

The State of Indiana went bankrupt in 1840 and the canal was completed by private enterprise.

#### The Whitewater Canal Today

#### The Ben Franklin III Canal Boat

Today, visitors can ride the *Ben Franklin III*, named after the first boat on the Whitewater Canal. It is designed to look like the old canal passenger boats, except it has a roof; old canal boats did not have a roof. The *Ben Franklin III* travels the same way the canal boats traveled in the 1840s and 1850s, with two horses pulling it. The canal is 26 feet

wide at the bottom, 40 feet wide at the top and four feet deep. The towpath for horses and miles is 10 feet wide. The horses walk along the path next to the canal and pull the boat along behind them. These are not speedboats, sailboats, or rowboats, but are flatboats designed for easy transportation for both passengers and cargo. Horses would often only travel from one town to the net and a boat got new horses at each town to eliminate stress placed on the animals.

#### Did You Know?

The Ben Franklin III weighs 10.5 tons and is 75 long.

#### The Duck Creek Aqueduct

The *Ben Franklin III* travels through the Duck Creek Aqueduct. An aqueduct is a body of water going over another body of water. The Duck Creek Aqueduct is a covered bridge that carries the canal 16 feet over Duck Creek. It is believed to be the only wooden aqueduct still operating in the United States. The original structure was built in 1843 but destroyed by a flood in 1846. Shortly after that, it was reconstructed using a covered bridge from the area.

#### Did You Know?

The inner beams are from the original bridge and are made of poplar.



### Activities: Upper Elementary, Grades 3 - 5

The visit to the *Whitewater Canal State Historic Site* and the use of this packet will, in part, fulfill the following requirements form the Indiana Academic Standards:

**Social Studies:** 3.1.2; 3.1.3; 3.1.4; 3.1.7; 3.4.3; 3.4.4; 4.1.6; 4.1.9; 4.1.15; 4.4.1; 4.4.3; 5.5.1

Language Arts: 3.1.5; 3.1.6; 3.2.3; 3.4.1; 3.4.4; 3.5.2; 3.5.3; 4.4.1; 4.4.3; 4.4.6; 4.4.7;

4.5.1; 4.5.3; 4.5.6; 5.2.1; 5.2.2; 5.4.2; 5.4.3; 5.4.4; 5.4.5; 5.5.4; 5.5.6

*Math:* 3.3; 3.5; 3.6; 4.2; 4.3; 4.5; 4.7; 5.2; 5.3; 5.5; 5.7

Science: 3.1.5; 3.1.6; 3.2.5; 3.6.3; 4.1.6; 4.1.7; 4.1.8; 4.6.3; 5.1.5; 5.2.3; 5.6.3

#### ACTIVITIES

#### LANGUAGE ARTS

- 1. Have students go to the local library or school media center. Students should find a book on life, clothing or children in the middle to late 1800s. Based on thier findings, have them write a story about what life would be like if s/he lived in that time period. Describe daily activities such as chores, games or school lessons. Also, be sure to have students include what they think life would be like in a community with a canal and mill.
- 2. Have students imagine that they are living in Metamora in 1850. You have just moved to town and this is the first time you have lived in a town with a mill. Have students write a letter to a friend who has never seen a mill and describe how the mill works; what its purpose is; what it looks like; and how it benefits the people in Metamora and that student's life. This will require students to take notes of what they learn while visiting the canal site.
- 3. Discussion: New Technology
  What things have been changed by technology in the 21<sup>st</sup> century? How have these changes been positive or negative? How do these changes affect people like millers? Is it fair for businesses to use improvements in technology to replace people in doing certain tasks and jobs?

#### **■** SOCIAL STUDIES

- 1. Canals were once used as a form of transportation. Today, there are many different kinds of transportation. What other forms of transportation do students think existed during the canals era in Indiana (circa 1819 1865)? Have students make a list of the forms of transportation that you think existed during that time period. Then go to the local library or media center to see if your list is correct. Once students have learned of the forms of transportation, write a paragraph describing the similarities and differences of each then and now.
- 2. Discussion: Canals in Indiana
  - Pass out the enclosed map of Indiana canals to students. Ask them these questions: Do you think people tended to live near a canal? What are important reasons for living near a canal? Would you want to live near a canal? Why or why not?

#### **■** MATH

- 1. A canal boat traveled 90 miles from Metamora to Cincinnati. Then the boat traveled 45 miles toward Metamora, turned around, and went 10 miles toward Cincinnati. How far away is the boat from Metamora?
- 2. A canal boat captain traveled between two towns in a total of 4.5 hours. Another canal boat captain made the same trip in 3.75 hours. What is the difference between their two travel times?
- 3. A canal boat traveled 38 miles in the first day, traveled ½ that distance the next day, and on the third day traveled twice the distance of the first day. How far did the canal boat travel in 3 days?
- 4. A miller can grind 10 pounds of grain in one hour. If the miller works 8 hours per day, six days per week, how many pounds can the miller grind in two full weeks?
- 5. A family of four traveled from Metamora to Cincinnati to visit a grandmother. First, the family paid some older boys \$2.60 to help them transport their luggage from home to the canal. Then the canal boat fare was \$3.00 per person. However, the family had extra luggage so it cost an extra \$0.50 per person. Then the family rode a stagecoach from the canal in Cincinnati to the grandmother's home at a cost of \$2.75 per person. The grandmother then insisted on paying for half of the trip's expenses. What is the total amount the family paid for the whole trip to the grandmother's house>
- 6. The town miller was trying to keep track of his records. In the month of May he found that he ground 1125 pounds of grain in the first week, 1250 pounds of grain in the second week, and 1375 pounds of grain in the third week. He could not find the record of how many pounds he ground in the fourth week. A) Based on the other week's figures, estimate the next logical number in the progression to determine how many pounds of grain he ground in the fourth week?; B) How many total pounds of grain did he grind in May?; C) What is the average number of pounds he grinded per week?

#### **SCIENCE**

1. After students visit to the *Whitewater Canal State Historic Site*, have them create a model of the canal boat. Use foam plates, toothpicks, construction paper, craft sticks or other supplies to create your canal boat. Then see if their boats will float. Ask students if they can explain why using models of a real object can help explain how that object works (in this instance, why is it worth making a model of the *Ben Franklin III* canal boat)? What kind of changes could have been made to canal boats to help them compete with railroads? Does the size of canal boats inhibit their ability to change to be a competitive form of transportation?

## Whitewater Canal State Historic Site Multiple Choice

After visiting the site, see what you can remember by choosing the correct answer.

Name:		Date:		
	1. The Whitewater Valley needed a		money lost during construction	
	nal for the following reasons EXCEPT:		7. The canal era in Indiana's history	
a.			considered to be	
	country.	a.		
	transportation	b.		
_	swimming		forgotten	
d.	commerce	d.	important	
	2. The 1836 Act which funded the		8. The boats travel on the canal using:	
car	nal was:	a.	motors	
a.	ı	b.	horses	
	the Improvement Commerce Act	c.	wind	
c.	the Commercial Improvement Act	d.	paddles	
d.	the Internal Improvement Act			
			9. Today, the canal boat travels over	
	3. The length of time it took to	the		
	mpletely finish the canal was	a.	Metamora Bridge	
	10 years		Whitewater Dam	
b.	12 years		Duck Creek Aqueduct	
	7 years	d.	Indiana Lock	
d.	4 years			
			10. Today, the Metamora Grist Mill	
	4. The two kinds of canal boats are:	gri	nds	
	freight and livestock boats		corn and oats	
	freight and packet boat	b.	wheat and soybeans	
	rowboats and packet boats	c.	corn and soybeans	
d.	livestock and rowboats	d.	wheat and corn	
	5. The first boat to travel the		11. The mill gets its power from	
Whitewater Canal was the		a.	a waterwheel	
a.	Ben Franklin	b.	a windmill	
b.	Jonathan Banes	c.	a mechanical gear	
c.	Thomas Jefferson		a miller turning cranks	
d.	Whitewater Queen			
			12. Mills were often built on	
6. The following problems led to the		a.	farms	
	d of canals in Indiana EXCEPT:	b.	rivers and streams	
a.	floods	c.	roads	
b.	railroads	d.	swampland	
c.	droughts		1	

Answers to the Whitewater Canal State Historic Site Multiple Choice									
1. C	2. D	3. A	4. B	5. A	6. C				
7. D	8. B	9. C	10. D	11. A	12. B				

## Math Activity Answers

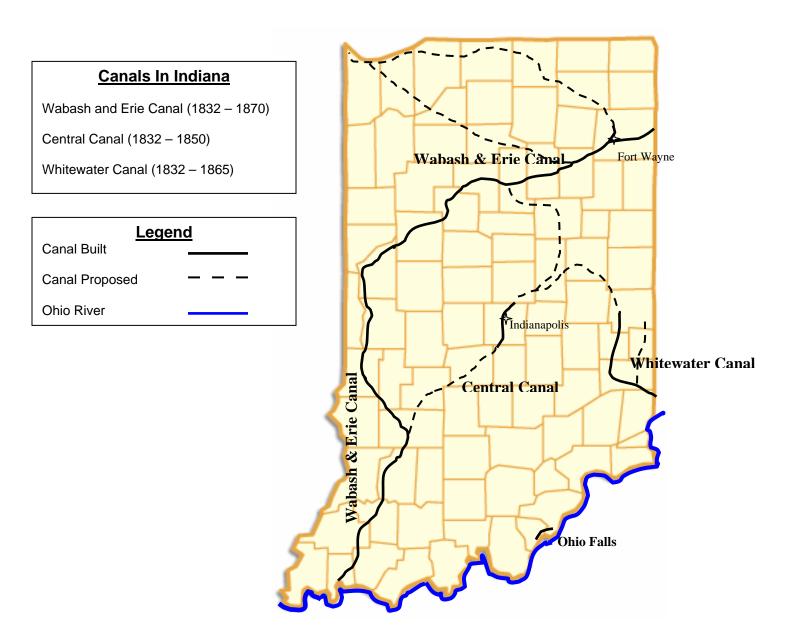
- 1. 55 miles
- 2. 45 minutes
- 3. 133 miles
- 4. 960 pounds
- 5. \$13.80
- 6. a) 1500 pounds
  - b) 5250 pounds
  - c) 1312.d pounds



## Map of Indiana Canals



## Especially for use with the Upper Elementary Social Studies Activity #2



H.O Garman, The Whitewater Canal, 1944